Claims

What is claimed is:

1. A tooling system for installing a fastener, comprising:

a tool body having a top drive end and a bottom working end and centered about an axis of rotation;

a plurality of helical displacers on the working end for acting upon a workpiece; ~~and~~

a cavity in the tool body at the working end thereof for holding a fastener to be installed in the workpiece; and fastener-gripping means in the tool body cavity.

2. The tooling system of claim 1 further including means for simultaneously rotating the tool body while moving it axially.

3. The tooling system of claim 1 wherein the displacers comprise arcuate ramps centered about the axis of rotation and each displacer extending between points of maximum and minimum height of the ramps.

4. The tooling system of claim 1 wherein the displacers are identical and symmetrically disposed about the axis of rotation.

5. The tooling system of claim 1 ~~having means for applying a vacuum from a source to the~~ wherein the tool body has an airway between the top and bottom ends whereby a vacuum holds the fastener in the cavity.

6. The tooling system of claim 5 wherein the ~~tool body has an airway between the top and bottom ends whereby the vacuum holds the fastener in the~~ cavity is located in the end of a resiliently biased pusher pin which acts between the tool body and the fastener and adapted to press upon the fastener during installation of the fastener into the workpiece.

7. The tooling system of claim 6 wherein the ~~cavity is located in the end of a resiliently biased~~ pusher pin ~~which acts between the tool body and the fastener and adapted to press upon the fastener during installation of the fastener into the workpiece~~ is hollow and has lateral ports for exclusively providing a airway between the vacuum source and the fastener.

8. The tooling systems of claim ~~7~~ 1 wherein the ~~pusher pin is hollow and has lateral ports for exclusively providing a airway between the vacuum source and the fastener~~cavity is located in the bottom end of a resiliently biased pusher pin for applying a downward installation force to the fastener and having a spring acting between the tool body and a top end of the pusher pin.

9. The tooling system~~s~~ of claim ~~1~~ 8 wherein the ~~cavity is located in the bottom end of a resiliently biased~~ pusher pin has~~for applying a downward installation force to the~~ fastener-gripping means comprising a plurality of balls moveable within lateral passageways in the ~~and having a spring acting between the tool body and a top end of the~~ pusher pin open into the cavity in the pusher pin.

10. The tooling system of claim 9 wherein the ~~pusher pin has fastener-gripping means comprising a plurality of~~ balls are biased inwardly against the fastener by an outer elastic band which encircles~~moveable within lateral passageways in the pusher pin open into the cavity in~~ the pusher pin.

11. The tooling system of claim 10 wherein~~ the balls are biased inwardly against the fastener by an outer elastic band which encircles the pusher pin~~ a ball-engaging bottom end of the elastic band has a 45-degree chamfer.

12. The tooling system of claim 1~~1~~ wherein~~ a ball-engaging bottom end of the elastic band has a 45-degree chamfer~~ the tool body has a plurality fastener-gripping balls moveable within lateral passageways in the tool body.

13. The tooling system of claim 12 wherein the balls are inwardly biased by an elastic band which encircles the passageways.~~tool body has a plurality fastener-gripping balls moveable within lateral passageways in the tool body.~~

14. The tooling system of claim 13 wherein the ~~balls are~~ inward~~ly~~ end of each of the passageways has narrowing lip for retaining the balls.~~ biased by an elastic band which encircles the passageways.~~

15. The tooling system~~s~~ of claim ~~14~~1 wherein the tool body has axially centered pusher pin having a bottom end of reduced diameter adapted for insertion into a magnetic release fastener whereby the fastener is held onto the tooling.~~inward end of each of the passageways has narrowing lip for retaining the balls.~~

16. The tooling systems of claim 15 wherein the ~~tool body has axially centered~~ pusher pin ~~having a bottom end of reduced diameter adapted for insertion into a magnetic release fastener whereby the fastener is held onto the tooling~~ has a collar which abuts the top of the fastener.

17. The tooling system of claim ~~16~~ 15 further including an anvil for supporting a fastener receiving panel, said anvil having a magnet whereby the fastener is released from the pusher pin as the fastener is pressed into the panel by the tool body as it rotates.~~wherein the pusher pin has a collar which abuts the top of the fastener.~~

18. The tooling system of claim ~~16~~ 17 wherein the fastener has a flange at the bottom for receiving the cold flow of material from the panel displaced by the displacers.~~further including an anvil for supporting a fastener receiving panel, said anvil having a magnet whereby the fastener is released from the pusher pin as the fastener is pressed into the panel by the tool body as it rotates.~~

19. ~~The~~ A tooling system ~~of claim 18 wherein the fastener has a flange at the bottom for receiving the cold flow of material from the panel displaced by the displacers~~ for installing a fastener, comprising:~~.~~

a tool body having a top drive end and a bottom working end and centered about an axis of rotation;

a plurality of helical displacers on the working end for acting upon a workpiece;

a cavity in the tool body at the working end thereof for holding a fastener to be installed in the workpiece; and

means for simultaneously rotating the tool body while moving it axially consisting of a CNC machine adapted to move selected individual fasteners laterally from a pickup point to an installation point.

~~20. The tooling system of claim 2 is a CNC machine adapted to move selected individual fasteners laterally from a pickup point to an installation point.~~